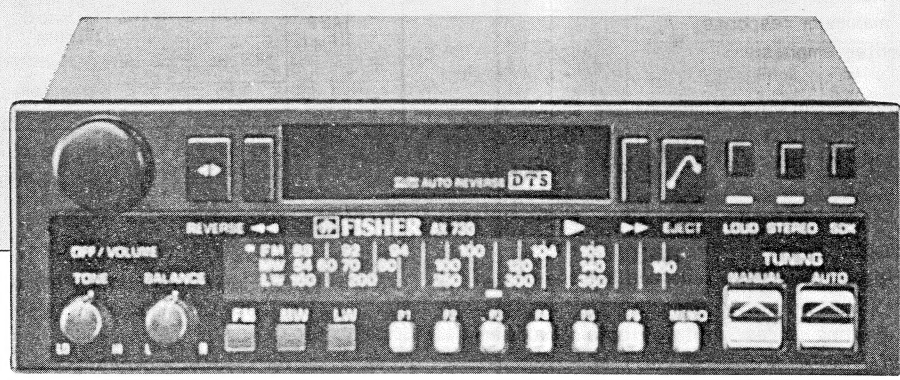
SERVICE MANUAL

FISHER®

AX730

FULL AUTO REVERSE CAR FIDELITY RECEIVER/ CASSETTE PLAYER



SPECIFICATIONS

TUNER SECTION FM

Tuning Range (MHz)	87.5—108 MHz
Channel Spacing (kHz)	50 kHz (Auto)
	50 kHz (Manual)
Sensitivity (150 ohms)	2 μV
Limiting Sensitivity	4 μV
Auto Scan Stop Level (DX)	10 μV
Image Rejection	60 dB
Selectivity (300 kHz)	65 dB
AM-Suppression	45 dB
Capture Ratio	2 dB
THD Mono	< 0.3%
Stereo	< 0.5%
Frequency Response (—4.5dB)	40—12,500 Hz
Channel Separation (1,000 Hz)	35 dB
S/N Ratio FM	60 dB

TUNER SECTION AM

Tuning Range MW	522—1611 kHz
Tuning Range LW	153—360 kHz
Channel Spacing MW	9 kHz
LW	1 kHz
Frequency Response (—4.5 dB)	40—2,000 Hz
Image Rejection (1,400 kHz)	55 dB
Selectivity (9 kHz)	±80 dB
Sensitivity MW	30 μV
LW	100 μV

CASSETTE SECTION

Max. Speed Deviation	±2.5%
Wow and Flutter	≦ 0.3%
Max. Winding Speed (C-60)	≦ 100 sec.
Frequency Response Fe_2O_3	63—12,500 Hz
S/N Ratio	48 dB
Crosstalk (1,000 Hz)	45 dB

GENERAL

Output Power (10%)	2x4.5W
DC Power Supply	11—15 volts
Current Drain (Power off)	20 mA
(Power on)	2 A
Dimension (WxHxD)	178x51x160 mm
Weight	1.5 kg

ALIGNMENT PROCEDURES

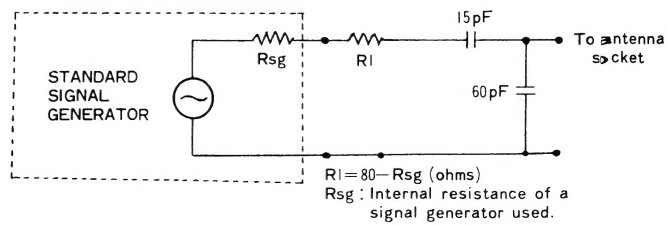
General
Test Conditions
Signal generator output;
Modulation frequency 1000 Hz
Modulation percentage 30%
Signal level just high enough to provide meter deflection.
Signal application;
Antenna receptacle through the dummy antenna.
Output meter connection
Across a speaker or a dummy load 4 ohms.
Setting of radio controls;
Volume control at maximum response.
Tone control at center emphasis.
Power supply 14V
* Location of the components for alignment are shown in MAIN PARTS IDENTIFICATION ILLUSTRATION (TOP VIEW).
NOTE: THE HEAD MUST BE CLEANED AND DEGAUSSED BEFORE ANY TESTING.

Alignment of Head Azimuth
1. Insert a BASF 8kHz standard test tape and set the unit in play mode.
2. Turn the azimuth adjusting screw until you obtain maximum reading on the VTVM.

MW, LW and RF Alignment

Step	Signal Input	Frequency of Signal Gen	Dial Setting of Radio	Test Equipment Connection	Adjustment
1	MW	—	522kHz	Connect a Voltage Meter to TP901 and Common ground.	Adjust L305 for voltage to be 1.0V
2	LW		153kHz		Adjust L306 for voltage to be 1.2V
3	Through dummy ANT (Fig.1)	603kHz	603kHz	Connect a VTVM to output terminal	Tune T301,L303 for maximum output
4		999kHz	999kHz		Tune T303,304 for maximum output
5		164kHz	164kHz		Tune T302 for maximum output
6		200kHz	200kHz		Tune L304 for maximum output
7					Repeat steps 5,6

Figure 1 DUMMY ANTENNA FOR MW AND LW RF ALIGNMENT

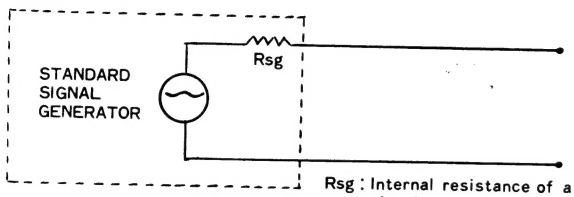


ALIGNMENT PROCEDURES

FM Alignment (No. 1)

Step	Signal Input	Frequency of Signal Gen	Dial Setting of Radio	Test Equipment Connection	Adjustment
1	Through dummy ANT. (Fig.2)	98.00MHz	98.00MHz	Connect a VTVM to SP terminal	Tune T401 for maximum output
2		98.026MHz (50dB)		Connect a Voltage Meter to TP902 and Common Ground	Tune L201 for Center Voltage (3.5V)
3		98.030MHz (50dB)			Make Sure that Low Voltage (0V)
4		98.020MHz			Make Sure that High Voltage (7V)
5		98.00MHz		Connect a VTVM to SP terminal	Adjust 3dB Limiting to be

Figure 2 DUMMY ANTENNA FOR FM RF ALIGNMENT



Rsg : Internal resistance of a signal generator used.

FM Alignment (No.2)

Step	Signal Input	Frequency of Signal Gen	Dial Setting of Radio	Test Equipment Connection	Adjustment
10	FM 17dbμ	98.00MHz	——	————	In mono position. adjust R206 for search stop sensitivity
11	FM 47dbμ	98.00MHz	——	————	In stereo position. adjust R219 for search stop sensitivity

FM MULTIPLEX ALIGNMENT (PLL)

PRELIMINARIES :

1. A stereo signal modulator (SSM) is necessary to perform this alignment.
2. All adjustments below must be done, setting the dial pointer at 98MHz on dial scale and applying 60dB FM signal modulated by specified signals as described below.
3. MPX button should be placed in stereo position in during FM multiplex alignment.

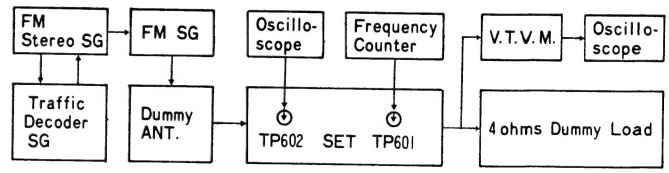
Step	Alignment	Instrument Connections		Adjustment
		Input	Output	
1	19kHz Pilot	No signal condition	Connect 500k~ IMΩ to TP251 and common ground. Connect frequency counter to TP252 and common ground.	Adjust R250 for frequency to be 19.00kHz
2 (1)	Stereo Signal	Apply FM stereo signal (modulated only by pilot signal at 10% modulation and stereo signal at 30% modulation) thro' dummy ant. to ant. terminals. Place output signal switch of S.S.M. in right position.	Connect VTVM to speaker output leads of Left Channel.	Stereo Separation Control R505 for minimum output on VTVM.
(2)		In addition. Set the output signal under input level of 40dB.	Connect VTVM to speaker output leads of Left Channel.	Adjust control R214. To make a separation of 10dB between left and right channel.

TRAFFIC DECODER ALIGNMENT

1. Test Equipment Required

- *FM Signal Generator
- *FM Stereo Signal Generator
- *Traffic Decoder Signal Generator
- *Frequency Counter
- *V. T. V. M.
- *Oscilloscope (30MHz)
- *Oscilloscope (Audio)
- *DC Power Supply
- *4 ohms Dummy Load

2. Traffic Decoder Test Equipment Set-up Diagram



3. Alignment Procedure

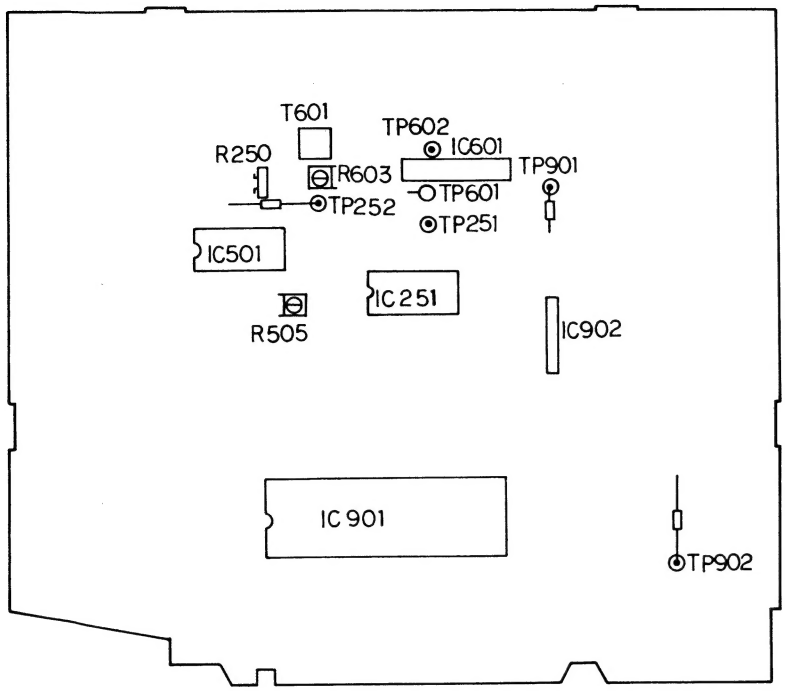
Step	Signal Input	FM SG	Stereo SG	Traffic SG	Dial Setting	Adjust For
1	Through dummy load.	98MHz 1kHz 30% Mod. Input : 60dBu	——	——	98MHz	————
2		98MHz EXT. Mod. Input; 60dBu	19kHz Pilot signal OFF No Mod.	57kHz Traffic Signal OFF	98MHz	R603 for 57kHz Connect the frequency counter to TP601.
3				57kHz Traffic signal ON 3.75kHz Mod.	98MHz	T601 Get to maximum output waveform after connecting oscilloscope to TP602.
4		98MHz Input; 60dBu	19kHz off 30% Mod. 1kHz.	SK ; 3.75kHz Mod. DK ; ON (30%) BK ; ON (60%)	98MHz	When volume minimum and SDK button ON position. Adjust R661 for Output Voltage (Speaker terminal) to be 450mV.

TRAFFIC DECODER ALIGNMENT (DK)

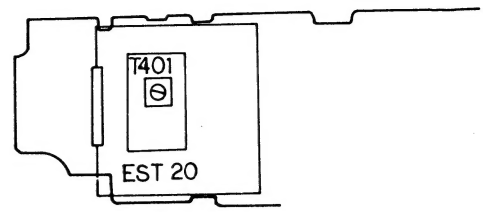
1. Connect frequency counter to TP651 and common ground.
2. Adjust R651 for frequency to be 125Hz.
3. Input is under the no signal condition.

MAIN PARTS IDENTIFICATION ILLUSTRATION

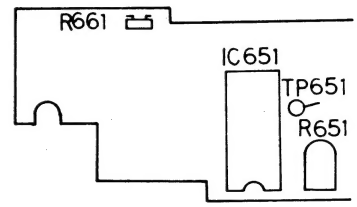
LOGIC PCB



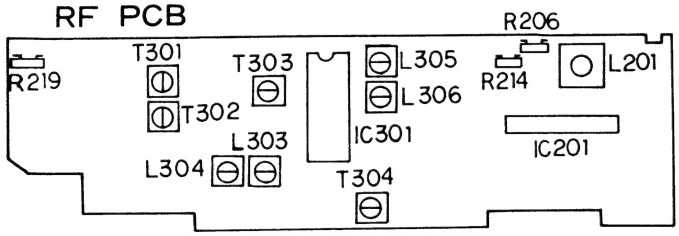
TUNER PCB



SDK AMP PCB

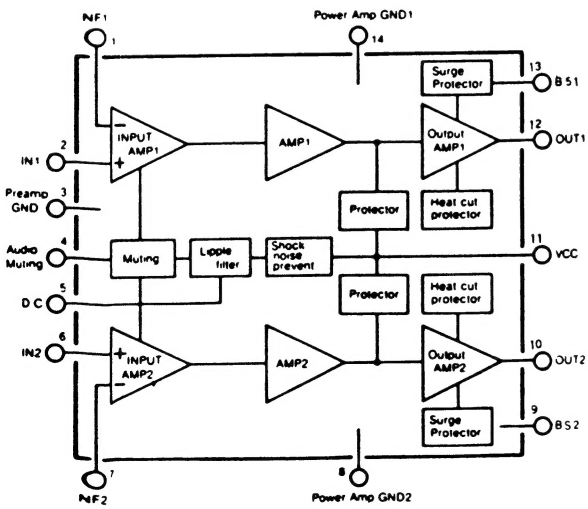


RF PCB

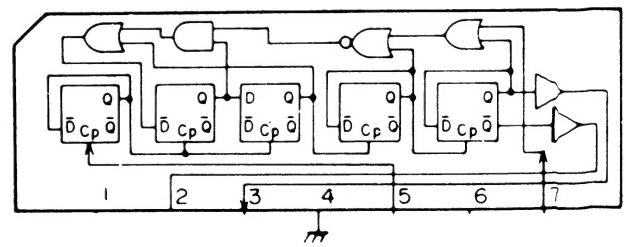


IC FUNCTIONS (1)

IC71, LA4440P

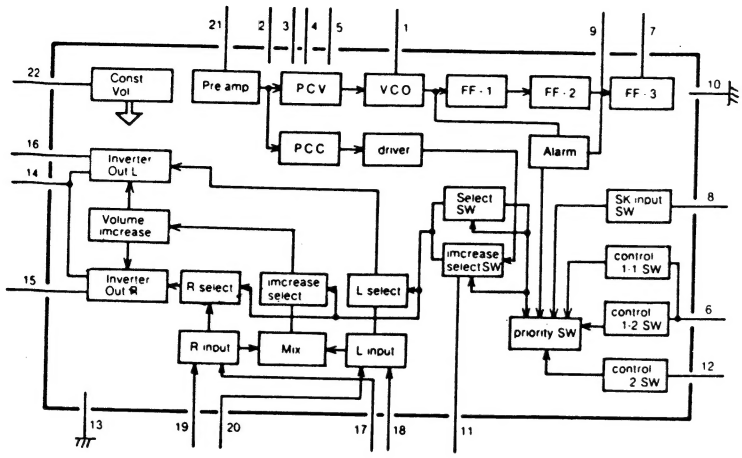


IC902, TD6104P

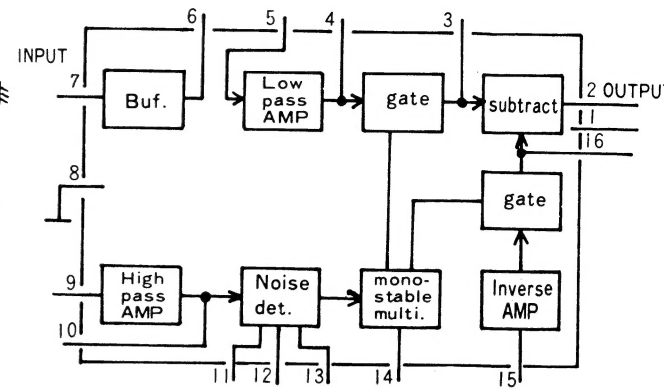


IC FUNCTIONS (1)

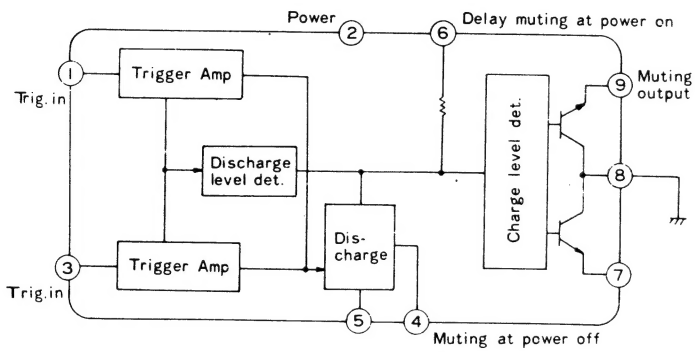
IC651, LA2211



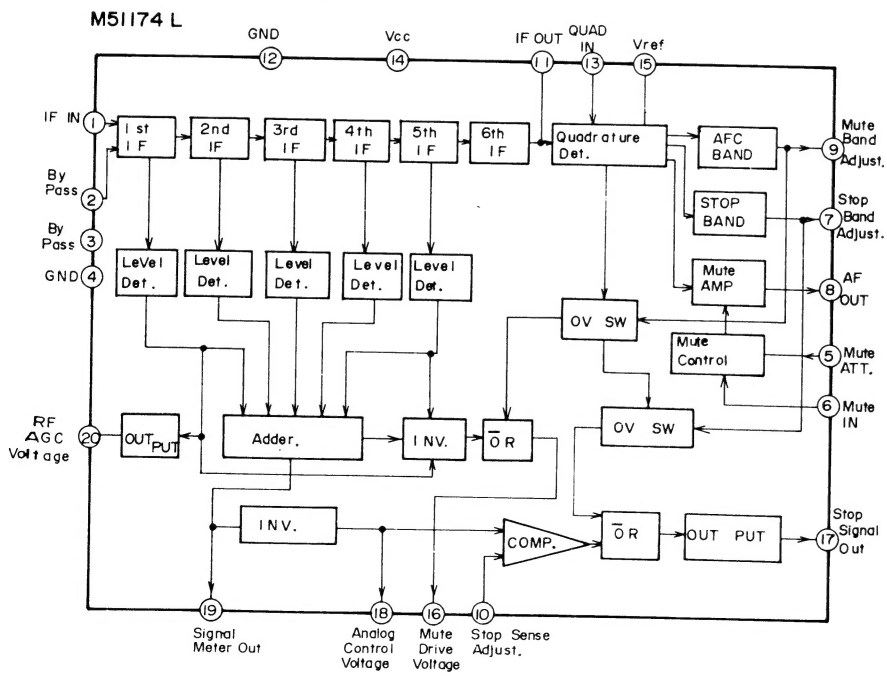
IC501, LA2113



IC903, TA7324P

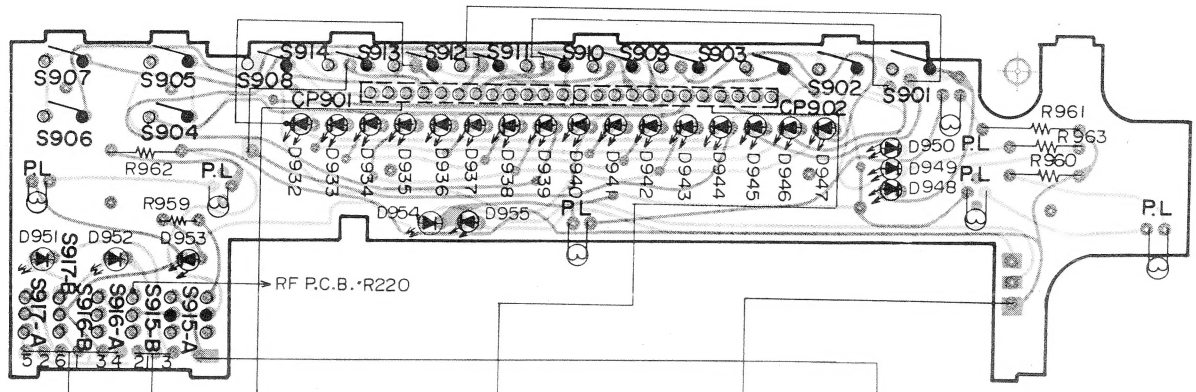


IC201, M51174L

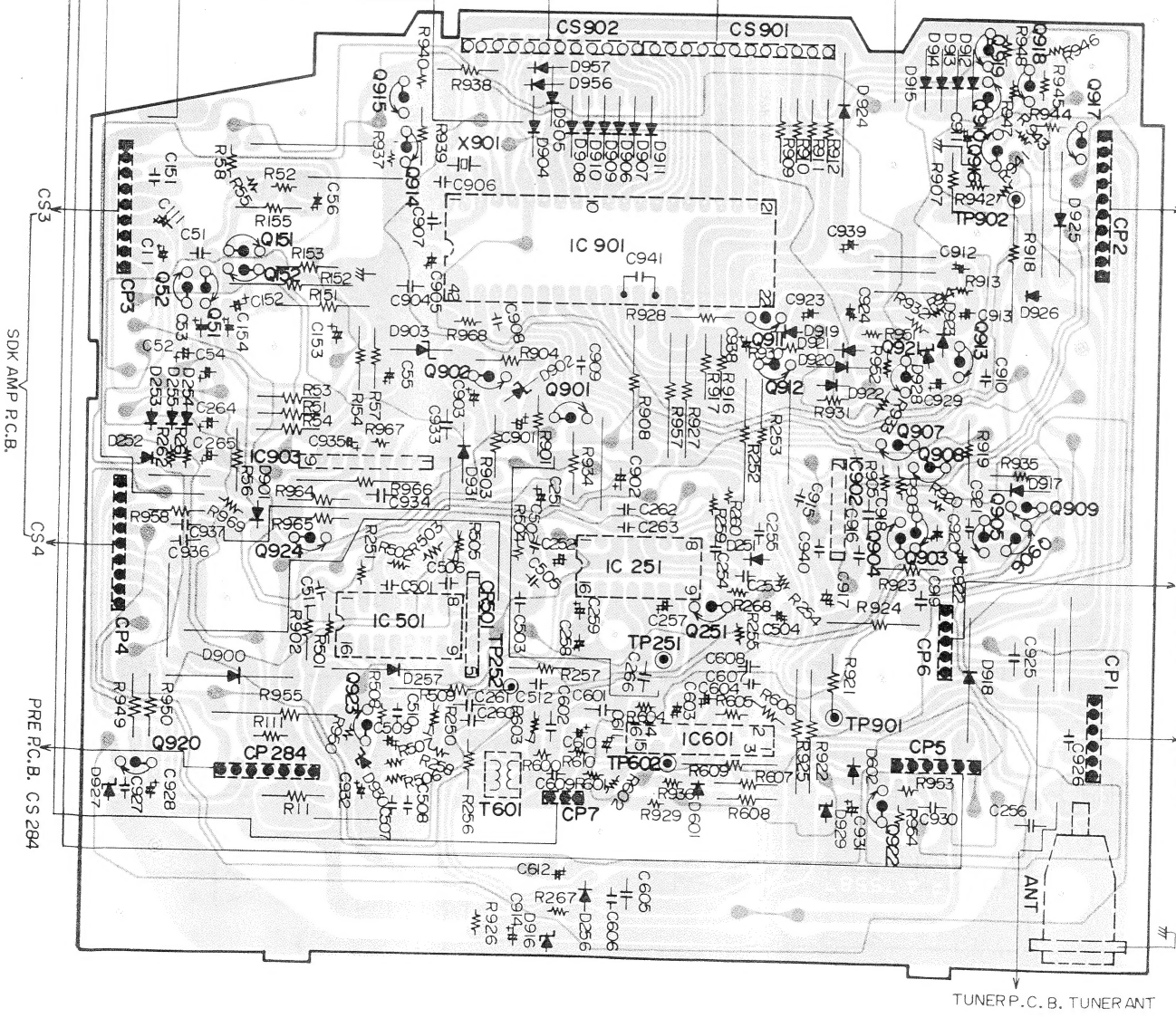


WIRING DIAGRAM

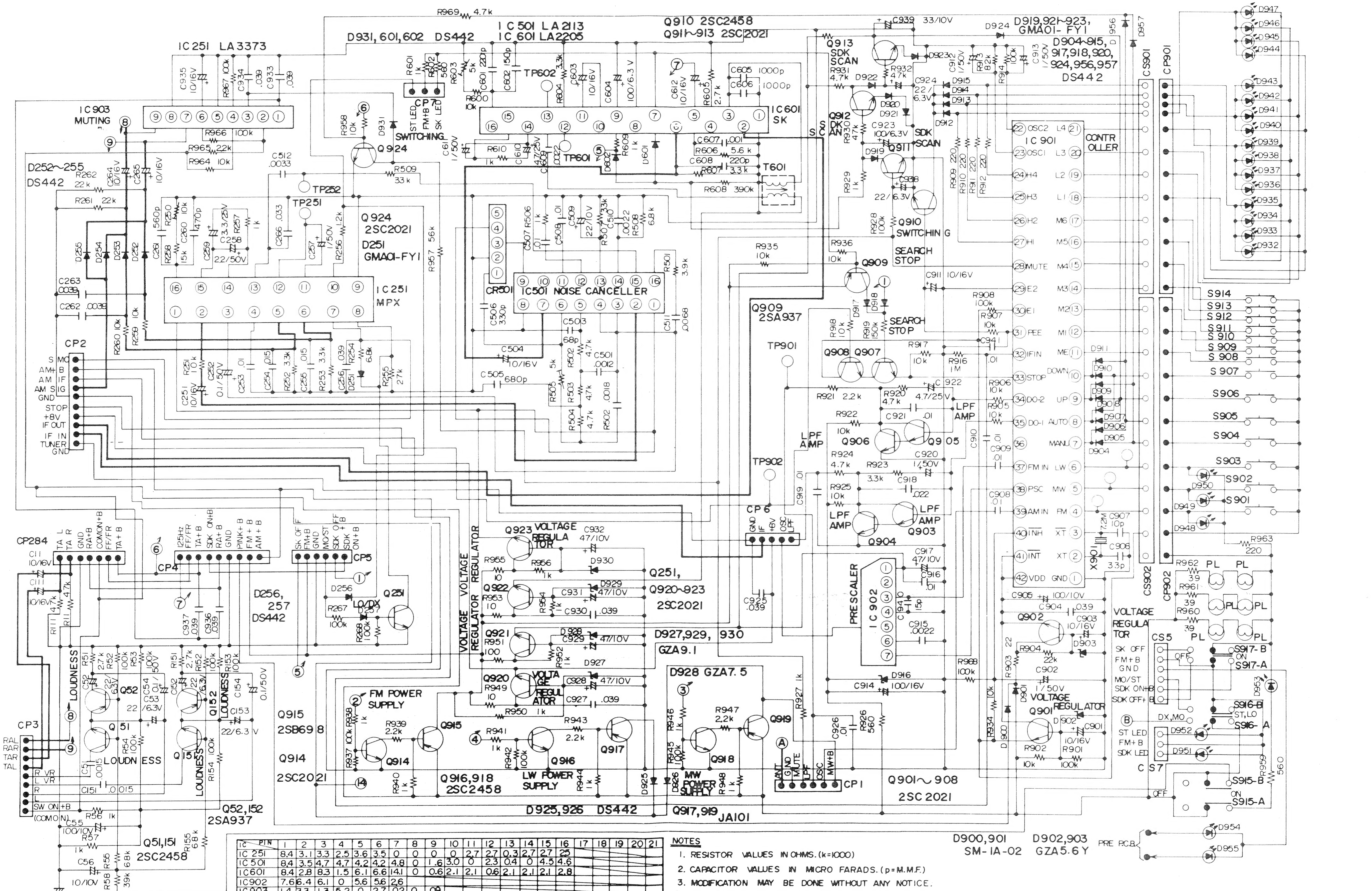
LED PCB Bottom



LOGIC PCB Bottom



SCHEMATIC DIAGRAM



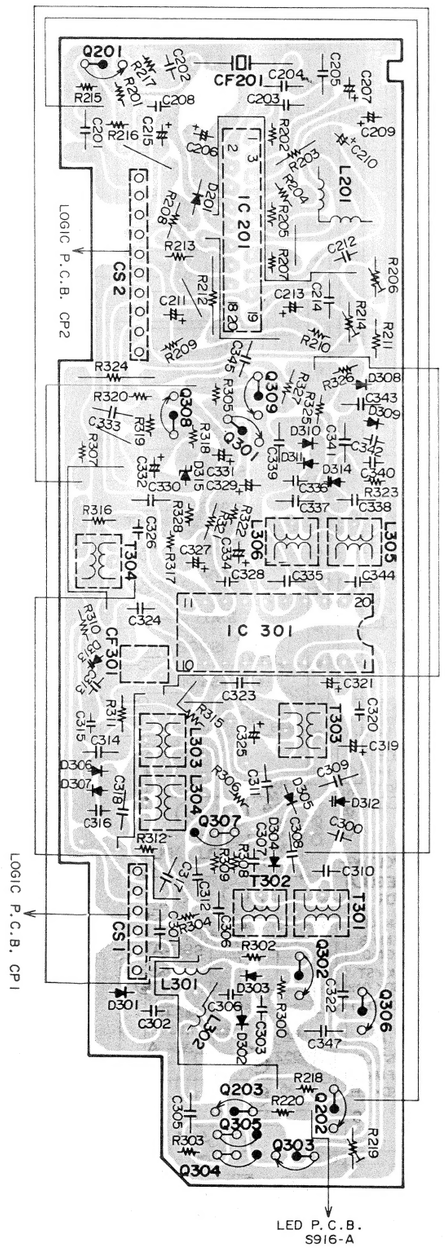
IC \ PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
IC251	8.4	3.1	3.3	2.5	3.6	3.5	0	0	0	0	2.7	2.7	0.3	2.7	2.7	2.5					
IC501	8.4	3.5	4.7	4.7	4.2	4.2	4.8	0	1.6	3.0	0	2.3	0.4	0	4.5	4.6					
IC601	8.4	2.8	8.3	1.5	6.1	6.6	14.1	0	0.6	2.1	2.1	0.6	2.1	2.1	2.1	2.8					
IC902	7.6	6.4	6.1	0	5.6	5.6	2.6														
IC903	1.4	3.3	1.3	5.2	0	2.7	0.2	0	0.9												
IC901	0	2.2	2.1	4.1	0	0	0.1	4.5	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	1.1	1.0	1.0	0.5
	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	0	0	0.1	4.2	0.1	0.1	0.3	0	4.9	0.3	3.1	0.8	1.0	1.0	0.3	22	2.6	4.7	4.5	4.9	4.9

NOTES

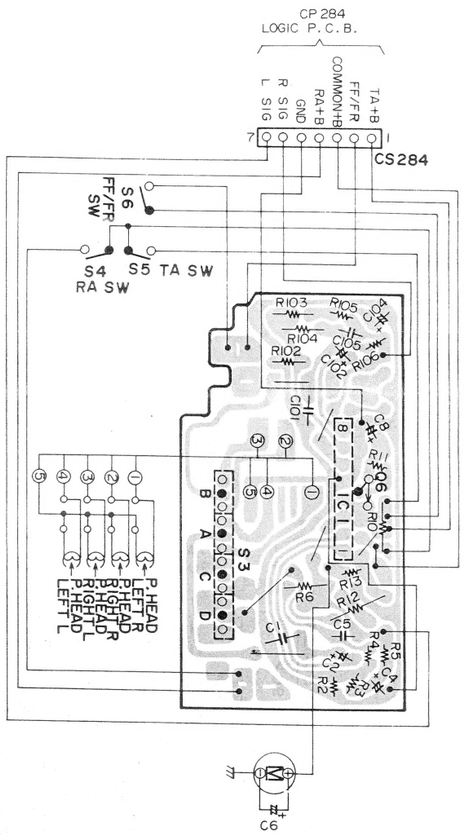
1. RESISTOR VALUES IN OHMS. (k=1000)
2. CAPACITOR VALUES IN MICRO FARADS. (p=M.M.F.)
3. MODIFICATION MAY BE DONE WITHOUT ANY NOTICE.
4. THE MENTIONED OF UNIT ON THE IC ARE VOLTS.

WIRING DIAGRAM

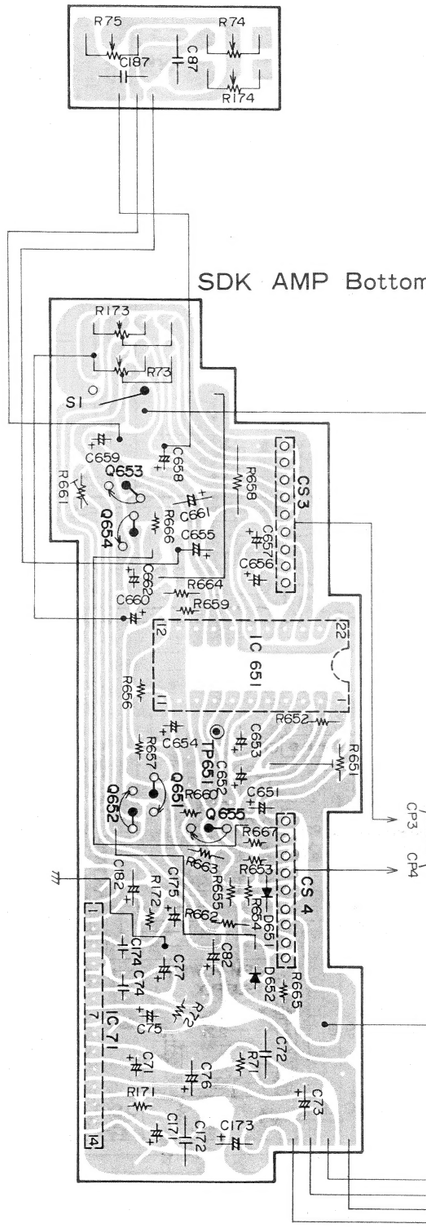
RF P.C.B. Bottom



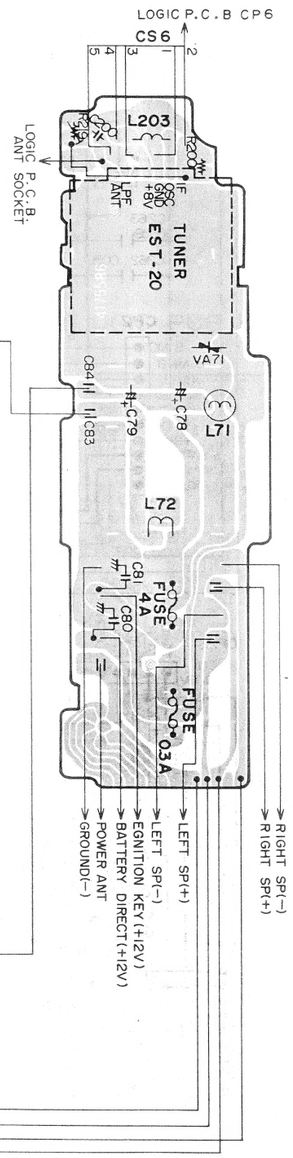
PRE P.C.B. Bottom



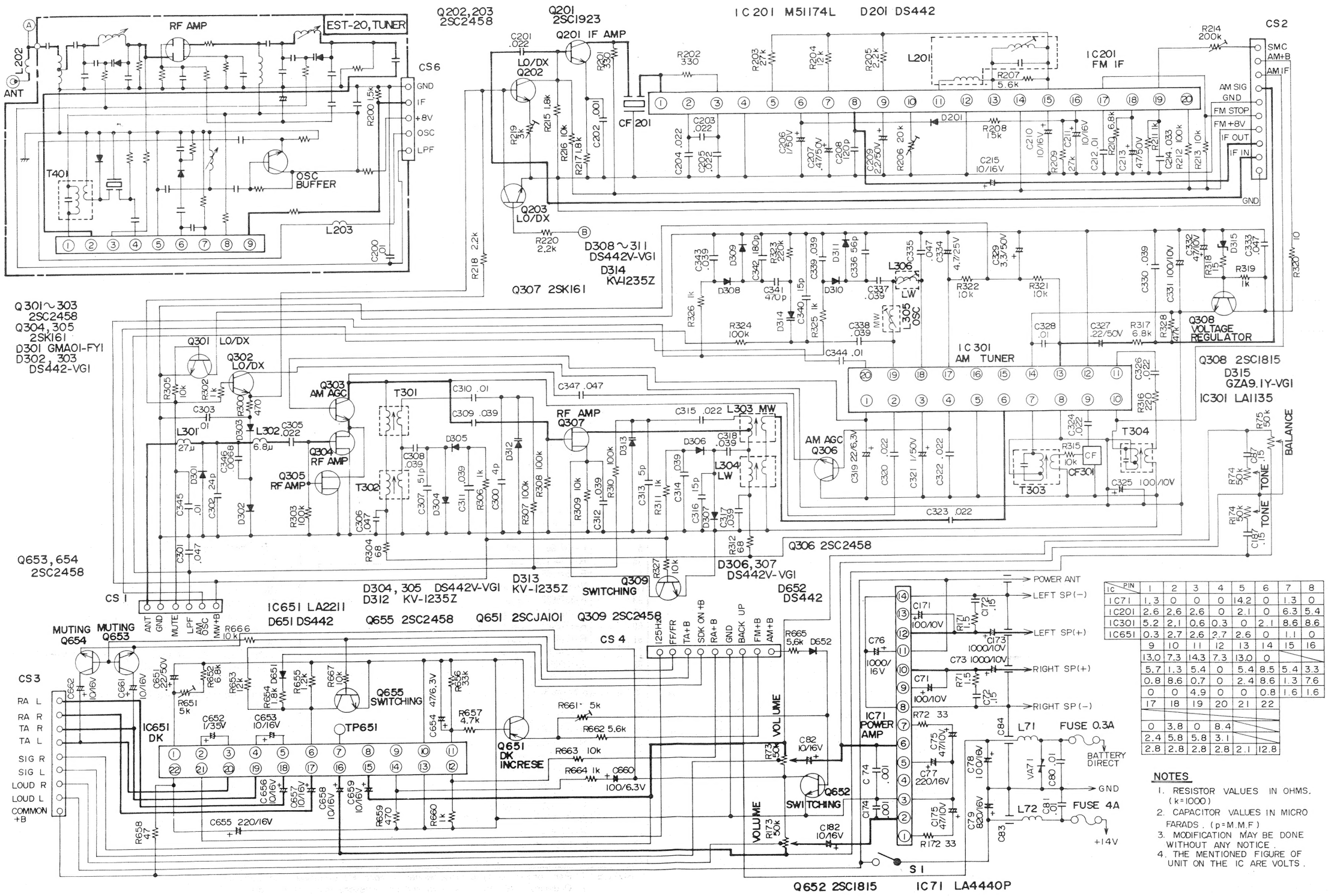
CONTROL P.C.B. Bottom



TUNER P.C.B. Bottom



SCHEMATIC DIAGRAM



IC \ PIN	1	2	3	4	5	6	7	8
IC71	1.3	0	0	0	14.2	0	1.3	0
IC201	2.6	2.6	2.6	0	2.1	0	6.3	5.4
IC301	5.2	2.1	0.6	0.3	0	2.1	8.6	8.6
IC651	0.3	2.7	2.6	2.7	2.6	0	1.1	0
	9	10	11	12	13	14	15	16
	13.0	7.3	14.3	7.3	13.0	0		
	5.7	1.3	5.4	0	5.4	8.5	5.4	3.3
	0.8	8.6	0.7	0	2.4	8.6	1.3	7.6
	0	0	4.9	0	0	0.8	1.6	1.6
	17	18	19	20	21	22		
	0	3.8	0	8.4				
	2.4	5.8	5.8	3.1				
	2.8	2.8	2.8	2.8	2.1	12.8		

NOTES

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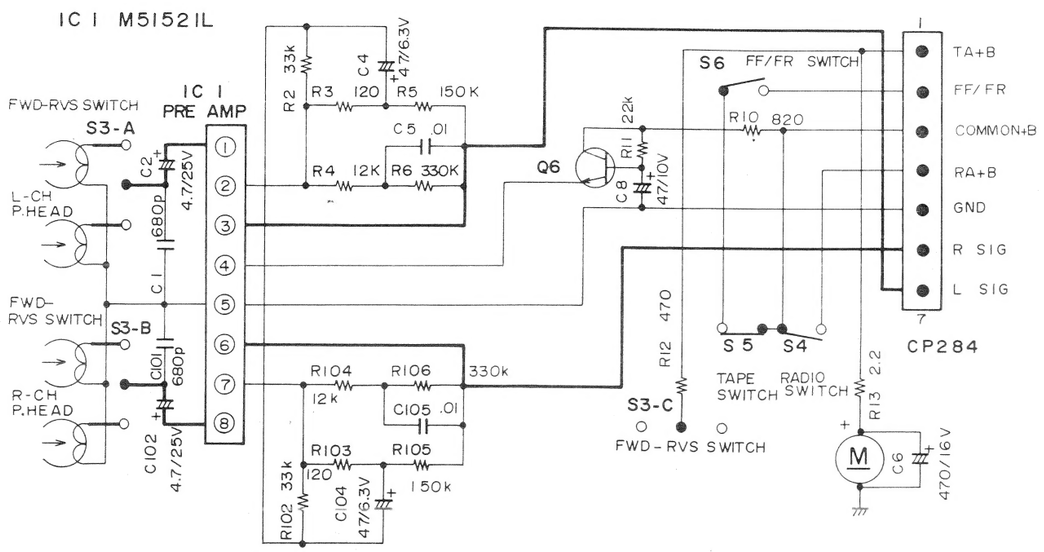
SCHEMATIC DIAGRAM



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IC \ PIN	1	2	3	4	5	6	7	8
IC 1	1.2	0.7	2.8	7.4	0	2.8	0.7	1.2

PARTS LIST (CASSETTE MECHANISM)

Key No.	Ref. No.	Part No.	Description	Q'ty
		CASSETTE MECHANISM (R-S873290)		
1		R-A701227	Chassis ass'y	1
2		R-A78799	Lever ass'y, Reverse A	1
3		W-SNUR15	E-ring, 1.5	1
4		R-A78800	Bracket ass'y, IDLER A	1
5		R-A78801	Bracket ass'y, FF	1
6		W-SNUR30	E-ring, 3	1
7		R-A78802	Base ass'y, Idler gear E	2
8		R-1571900A	Coil spring	1
9		R-3975643A	Gear, Idler D	1
10		R-3975642	Gear, Idler B	1
11		R-3975641A	Gear, Idler C	1
12		R-3975640	Gear, Idler A	1
13		R-3972246	Special washer	4
14		R-1274540A	Lever, Rev F	1
15		R-1274541	Lever, Rev lock	1
16		R-1571899	Torsion spring	1
17		W-SNUR15	E-ring, 1.5	1
18		R-A78901	Gear ass'y, Reverse	1

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

PARTS LIST (CASSETTE MECHANISM)

Key No.	Ref. No.	Part No.	Description	Q'ty
19		W-SNUR15	E-ring, 1.5	1
20		R-137205A	Plate spring	1
21		B-SSTB171FZ1	Screw, Pan Hd. T-TPS3	1
22		R-137206	Plate spring	1
23		R-3975638	Gear, Drive	1
117		W-NSRW204025	Washer TH, 2x4x0.25	1
24		W-SNUR12	E-ring, 1.2	1
25		R-A78906	Lever ass'y, Reverse	1
26		R-3972246	Special washer	1
27		W-SNUR20	E-ring, 2	1
28		R-A78806	Reel ass'y, Boss	2
29		R-3975634	Spacer	2
30		R-137208	Sensor, F	1
31		R-137209B	Sensor, FR	1
32		R-137210D	Sensor, R	1
33		R-1571902	Wire spring	1
34		R-1571903B	Compression spring	1
35		R-3974102	Reel guide	2
126		R-1572115	Compression spring	1
36		W-NSRW204013	Washer TH, 2x4x0.13	2
37		R-3972246	Special washer	2
38		R-A78903	Lever ass'y, Head A	1
39		R-1571920	Wire spring	1
40		R-A76271	Lever ass'y, Pinch roller	1
41		R-A78808	Lever ass'y, PF	1
42		W-SNUR20	E-ring, 2	1
43		R-A76272	Lever ass'y, Pinch roller	1
44		R-A78809	Lever ass'y, PR	1
45		R-1274627	Lever, Eject D	1
46		W-SNUR20	E-ring, 2	1
47		R-3972423	Special washer	1
48		R-1571962	Special screw	1
49		R-A78810	Sensor ass'y, Reverse	1
50		R-3975633A	Guide, Sensor	1
51		R-1571904	Coil spring	1
52		R-A79346	Bracket ass'y, FF, Lock	1
118		B-SSTB202EZ1	Screw, Pan Hd., T-TPS3.2x2.5	1
53		R-1274618A	Lever, FF lock	1
54		W-SNUR20	E-ring, 2	1
55		R-1571967	Coil spring	1
56		R-1274617A	Lever, FF lock release	1
57		R-1571955A	Wire spring	1
119		W-SNUR20	E-ring, 2	1
58		R-3975632	Gear, FF drive	1
59		R-1571911A	Torsion spring	1
60		R-3972423	Special washer	1
61		R-1274554	Lever, RWD A	1
62		R-1274555B	Lever, FF A	1
63		R-S872997	Flywheel	1
64		R-S872484	Pulley	1
120		R-S872997-L	Flywheel	1
65		W-NSRW204025	Washer TH, 2x4x0.25	2
67		R-3975768	Special washer	2
66		R-3975767	Special washer	2
68		R-3972246	Special washer	1
69		R-A78815	Bracket ass'y, Mecha left	1
70		R-1275166A	Lever, REV	1
71		R-1275167	Lever, RWD	1
72		R-1571912A	Coil spring	1
73		R-1571913	Coil spring	1
74		R-1274556A	Lever, RWD B	1
75		R-1571984	Special screw	1
76		B-STSS2605Z1	Screw, Flat Hd., T-T S, 2.6x5	2
77		R-1274566A	Case, A	1
78		R-A78816	Case ass'y, B	1
79		R-A78817	Guide ass'y, Cassette	1
81		R-1571914	Torsion spring	1
82		R-A78818	Bracket ass'y, Mecha right	1
83		R-A701032	Lever ass'y, Eject A	1
84		R-1275170A	Lever, FF	1
85		R-1274563	Lever, Slotin B	1
86		R-1274564	Lever, Eject lock	1
87		R-1571897	Special screw	1
88		R-1571915	Coil spring	1
89		R-1571917	Coil spring	2
90		R-1571918	Coil spring	1
91		W-SNUR20	E-ring, 2	5
92		B-STSS2605Z1	Screw, Flat Hd., T-T S, 2.6x5	2
94		R-1571964	Coil spring	1
95		R-A78820	Lever ass'y, Slotin A	1
96		R-2470263A	Sleeve, Slotin point	1
97		B-SSTR203EZ1	Screw, Flat Hd., T-TPS3	1
98		R-S57195-2	DC motor	1
99		B-SNAB2603Z1	Screw, Pan Hd., 2.6x3	2
100		R-4470708B	Square belt	1
101		R-S07461	Playback head	1
102		R-1571919	Compression spring	1
103		R-S37485	FPC board	1
104		B-SPRM2004Z1	Screw, Bind Hd., +−, 2x4	2
105		R-S47677	Leaf switch	1
106		R-S47990	Leaf switch	1
107		R-S47993B	Leaf switch	1
108		B-STSN2604Z1	Screw, Pan Hd., T-T S, 2.6x4	1
109		B-SSTB172HZ1	Screw, Pan Hd., T-TPS3	2
110		B-SSTB202EZ1	Screw, Pan Hd., T-TPS3, 2x2.5	1
111		R-4174817	Cover	1
112		B-SSTB172HZ1	Screw, Pan Hd., T-TPS3	2
113		R-1274728	Bracket, Switch	1
114		W-SB0WI7383ZI	Washer flat, 1.7x3.8x0.3	1
115		B-SSTB173EZ1	Screw, Pan Hd., T-TPS3	1
		PRE P.C.B. ASSEMBLY		
116		R-A701375	PC board ass'y, PRE	1
	S3	R-S47992-1	Slide switch	1
	CS1	R-S27507-12	Cord, 120mm	1
	IC1	M5152IL	IC	1
	Q6	2SC1740	Transistor	1
	C2, 102	EAR4R7M2EN2	Lytic, 4.7μF, ±20%, 25V	2
	C4, 104	EAR470M1IN2	Lytic, 47μF, ±20%, 6.3V	2
	C6	EAS471M2CN2	Lytic, 470μF, ±20%, 16V	1
	C8	EGM470M2AN2	Lytic, 47μF, ±20%, 10V	1
	C1, 101	KS681J2HN2	Ceramic, 680pF, ±5%, 50V	2
	C5, 105	BM103K2EN2	SBL, 0.01μF, ±10%, 25V	2
	R3	T-D0121JBAN2	Carbon, 120, ±5%, 1/6W	1
	R2	T-D0333JBAN2	Carbon, 33k, ±5%, 1/6W	1
	R102	T-D0333JBAN1	Carbon, 33k, ±5%, 1/6W	1
	R103	T-D0121JBAN1	Carbon, 120, ±5%, 1/6W	1
	R4	T-D0123JBAN2	Carbon, 12k, ±5%, 1/6W	1
	R104	T-D0123JBAN2	Carbon, 12k, ±5%, 1/6W	1
	R5, 105	T-D0154JBAN2	Carbon, 150k, ±5%, 1/6W	2
	R6	T-D0334JBAN1	Carbon, 330k, ±5%, 1/6W	1
	R106	T-D0334JBAN2	Carbon, 330k, ±5%, 1/6W	1
	R10	T-D0821JBAN1	Carbon, 820, ±5%, 1/6W	1
	R11	T-D0223JBAN2	Carbon, 22k, ±5%, 1/6W	1
	R12	T-D3471JAN2	Carbon, 470, ±5%, 1/2W	1
	R13	T-D32R2JAN2	Carbon, 2.2, ±5%, 1/2W	1

NOTES : 1. Part orders must contain Model Number, Part Number and Description.
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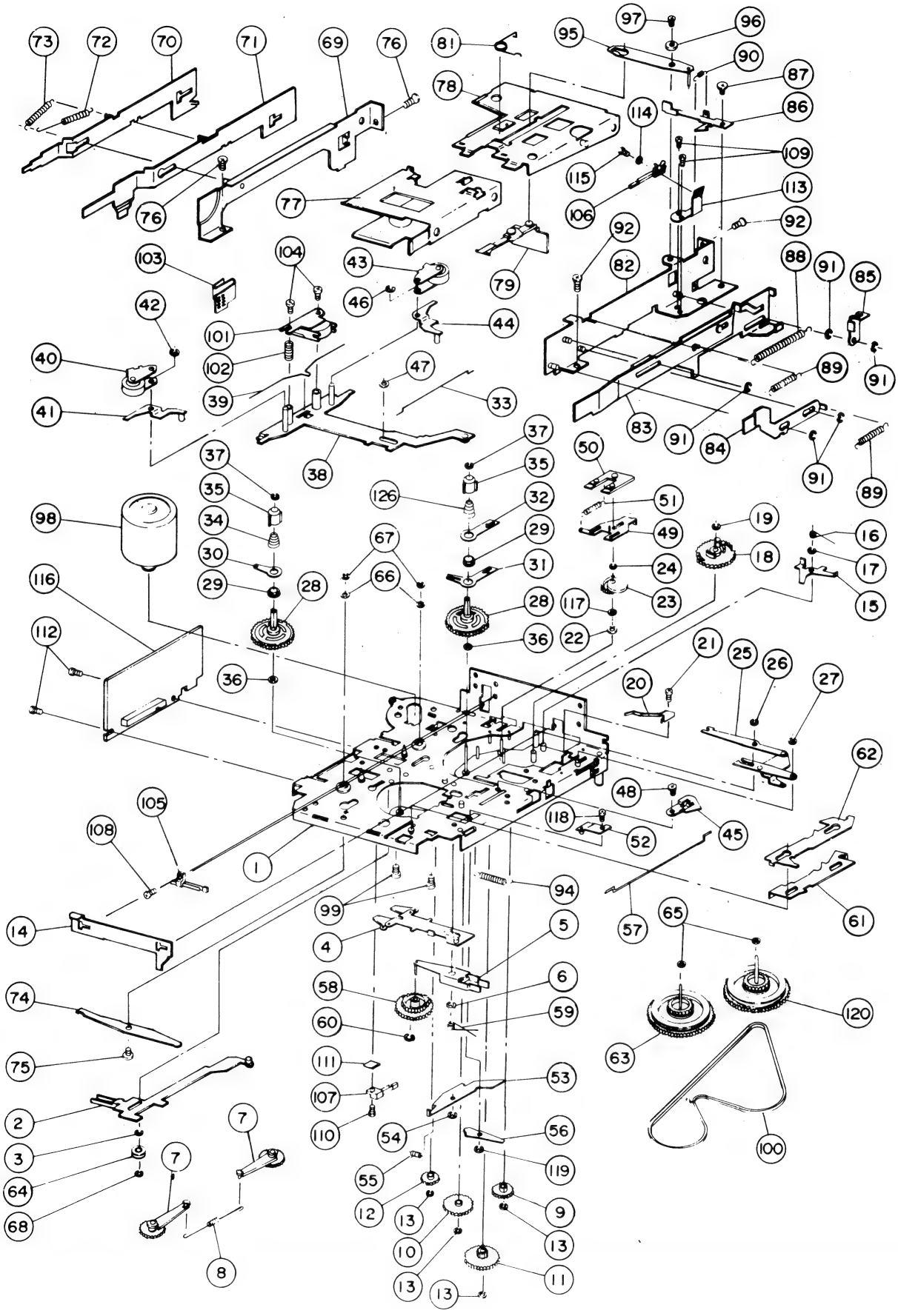
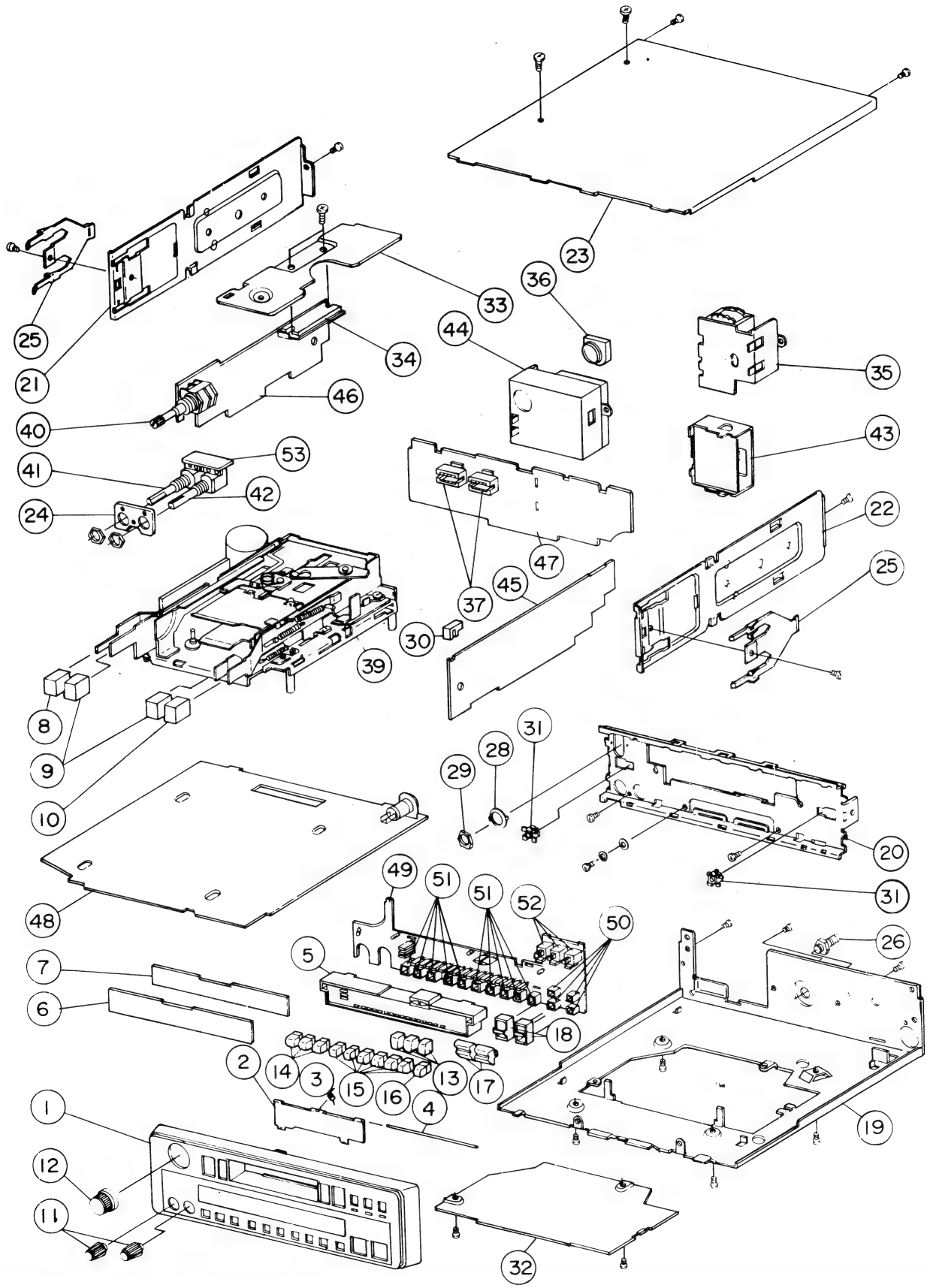
EXPLODED VIEW (CASSETTE MECHANISM)



EXPLODED VIEW (CABINET & CHASSIS)



PARTS LIST

Key No.	Ref. No.	Part No.	Description	Q'ty
INDIVIDUAL				
		R-4076590-1	Individual carton case	1
		R-4174591	Styro-foam cushion, Side	2
		R-4777977	Instruction book	1
		R-4773695D	Guarantee card	1
		R-4777000	Guarantee card, FTZ	1
		R-357529-1	Polyethylene bag, 260x340	1
ACCESSORY				
		R-357527-1	Polyethylene bag, 100x100	1
		R-S17348	Fuse, 125V, 4A	1
		R-S17174	Fuse, 125V 0.3A	1
CABINET				
1		R-A701885	Nose panel ass'y	1
2		R-2673870A	Door	1
3		R-157679	Torsion spring	1
4		R-1570117	Shaft	1
5		R-3976407	Back plate	1
6		R-3870669	Dial scale	1
7		R-3870693	Shade plate	1
8		R-3976402	Knob, REV	1
9		R-3976403	Knob, F. FWD	2
10		R-3976404	Knob, Eject	1
11		R-3975546-1	Knob, Volume, Tone, Balance	2
12		R-3975606-1	Knob, Volume, ON-OFF/Volume	1
13		R-3976405	Knob, Switch, Loud, Stereo, SDK	3
14		R-3976406	Knob, switch, FM, MW, LW	3
15		R-3975537-1	Knob, Switch, P1—P6	6
16		R-3975537-2	Knob, Switch, MEMO	1
17		R-3975528A	Knob, Tuning, Manual, Auto	2
18		R-3975529	Bracket, Switch, Manual, Auto	2
		R-4777001-3	Rating label	1
		R-4777421	Caution label	1
		R-4776997-2	Parts name label, 4A	1
		R-4776997-1	Parts name label, 0.3A	1
		R-4777245	Cover, Fisher	1
		R-4777117	Label, SDK	1
CHASSIS				
19		R-1275327	Metal casing, Base	1
20		R-1275328	Front chassis	1
		B-STBN2604ZI	Screw, Pan Hd., T-T B, 2.6x4	2
21		R-1275383	Side chassis, LEFT	1
22		R-1274449A	Side chassis, RIGHT	1
		B-STBS3006ZI	Screw, Flat Hd., T-T B, 3x6	2
23		R-1275342	Top lid	1
		B-STBN3006ZI	Screw, Pan Hd., T-T B, 3x6	4
24		R-1275326	Bracket, Resistor	1
		B-STBN2606ZI	Screw, Pan Hd., T-T B, 2.6x6	1
25		R-1274465A	Plate spring	2
26		R-1571833	Special screw	1
28		R-1270744	Special washer	1
29		R-247206	Special Nut	1
30		R-3975538	Bracket, PC board	1
31		R-3975527	Bracket, PC board, Front	2
		B-STBN2606ZI	Screw, Pan Hd., T-T B, 2.6x6	2
32		R-1273801	Cover	1
		B-STBN2605ZI	Screw, Pan Hd., T-T B, 2.6x5	2
		B-SNAB2605ZI	Screw, Pan Hd., 2.6x5, Mechanism	4
33		R-2673869	Heat sink	1
		B-STBN3006ZI	Screw, Pan Hd., T-T B, 3x6	1
34		R-1273734	Bracket, IC	1
		B-SNAB3010ZI	Screw, Pan Hd., 3x10, IC	2
35		R-1274466	Shield case	1
		B-STBN2605ZI	Screw, Pan Hd., T-T B, 2.6x5, Metal casing seald case	1
36		R-3975585	Cap, DIN socket	1
37		R-367280A	Fixture, DIN socket	2
		B-SNAB2605ZI	Screw, Pan Hd., 2.6x5, DIN socket	2
		R-4470723	Cushion, Logic P. C. B.	2
		R-437458	Felt cushion, RF P. C. B.	1

Key No.	Ref. No.	Part No.	Description	Q'ty
38		R-4172934	Rubber cushion, RF P. C. B.	
CHASSIS ELECTRICAL				
39		R-S873290	Cassette mechanism, FEC-284	1
40	R73, 173, SI	R-RI107026-1	Rotary volume, 50kx2	1
41	R74, 174	R-RI107017-1	Rotary volume, 50kx2	1
42	R75	R-RI107027	Rotary volume, 50k	1
43		R-S872990	Tuner, EST-20	1
44		R-S27694-2	Socket, Power SP	1
		R-S17174	Fuse, 125V 0.3A	1
		R-S17348	Fuse, 125V 4A	1
	CS1	R-S27647-6	Socket, 6P	1
	CS2	R-S27647-10	Socket, 10P	1
	CS3,4	R-S27647-9	Socket, 9P	2
	CS5	R-S27516-16	Cord, 160mm	1
	CS6	R-S27515-10	Cord, 100mm	1
	CS7	R-S27513-22	Cord, 220mm	1
	CS901, 902	R-S27652-12	Socket, 12P	2
		R-S17115	Pilot lamp, 5V 60mA	3
		R-S871393-3	Pilot lamp ass'y, 5V 60mA	3
	D948, 949, 950	SLP-174B	LED	3
	D932~947	SLP-159B	LED	16
	D954, 955	LN328GP	LED	2
	D953	SLP-255B	LED	1
	D951	SLP-455B	LED	1
	D952	SLP-155B	LED	1
	C87, 187	C-FMZ154J2HN2	TF cap, 0.15μF, ±5%, 50V	2
	C83, 84	R-C4716-2	Noise suppression cap	2
	L72	R-W67067-1A	Choke coil	1
	L71	R-W17068	Choke coil, 3MH	1
50	S904~907	R-S47971	Key switch	4
53		R-4175584-2	PC board, Control	1
RF P. C. B. ASSEMBLY				
45		R-A701891	PC board ass'y, RF	1
	CF301	R-S17637	Ceramic filter, 450kHz	1
	CF201	R-S17572-1	Ceramic filter, 10.700MHz	1
	R219	R-RI10738	Preset resistor, 3k	1
	R206	R-RI10758	Preset resistor, 20k	1
	R214	R-RI10742	Preset resistor, 200k ohm	1
	L301	R-W17082-4	Choke coil, 27μH	1
	L302	R-W17082-3	Choke coil, 6.8μH	1
	T301, L303	R-W27133	RF coil	2
	T302	R-W27138A	RF coil	1
	L304	R-W27139	Antenna coil	1
	L305	R-W87035	OSC coil	1
	L306	R-W8796-3	OSC coil	1
	T303	R-W5T7023-1	IF transformer	1
	T304	R-W5T7025	IF transformer	1
	L201	R-W5T7063-1	IF transformer	1
	IC301	LA1135	IC	1
	IC201	M51174L	IC	1
	Q301-303, 306, 309, 202, 203	2SC2458GR	Transistor	7
	Q304, 305, 307	2SK161GR	Transistor	3
	Q308	2SC1815GR	Transistor	1
	Q201	2SC1923O	Transistor	1
	D301	GMA01-FY1	Diode	1
	D302, 303, 201	IS2473VH	Diode	3
		DS442VG1		
	D304~311	DS442V-VG1	Diode	8
	D312, 313, 314	KV1235Z	Varactor diode, Do not use diodes from different chips but a pair of diodes from a same chip.	3/3
	D315	GZA9R1Y-VG1	Zener diode	1
	C319	C-EMK220M1IN2	Lytic, 22μF, ±20%, 6.3V	1

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PARTS LIST

Key No.	Ref. No.	Part No.	Description	Q'ty
	C327	C-EMKR22MHN2	Lytic, 0.22μF, ±20%, 50V	1
	C331,325	C-EGW101M2AN2	Lytic, 100μF, ±20%, 10V	2
	C332	C-EGW470M2AN2	Lytic, 47μF, ±20%, 10V	1
	C329	C-EMK3R3M2HN2	Lytic, 3.3μF, ±20%, 50V	1
	C334	C-EMK4R7M2EN2	Lytic, 4.7μF, ±20%, 25V	1
	C207,213	C-EMKR47M2HN2	Lytic, 0.47μF, ±20%, 50V	2
	C209	C-EMK2R2M2HN2	Lytic, 2.2μF, ±20%, 50V	1
	C210,211, 215	C-EMK100M2CN2	Lytic, 10μF, ±20%, 16V	3
	C206,321	C-EMK1R0M2HN2	Lytic, 1μF, ±20%, 50V	2
	C300	C-CJ4R0D2HN2	Ceramic, 4pF, ±0.5pF, 50V	1
	C302	C-CJ240K2HN2	Ceramic, 24pF, ±10%, 50V	1
	C307	C-CJ510K2HN2	Ceramic, 51pF, ±10%, 50V	1
	C313	C-CJ5R0D2HN2	Ceramic, 5pF, ±0.5pF, 50V	1
	C316,340	C-CJ150K2HN2	Ceramic, 15pF, ±10%, 50V	2
	C336	C-CJ560K2HN2	Ceramic, 56pF, ±10%, 50V	1
	C341	C-KS471J2HN2	Ceramic, 470pF, ±5%, 50V	1
	C342	C-KS181J2HN2	Ceramic, 180pF, ±5%, 50V	1
	C208	C-CJ121K2HN2	Ceramic, 120pF, ±10%, 50V	1
	C301,306, 333,335, 347	C-BM473M2EN2	SBL, 0.047μF, ±20%, 25V	5
	C303,310, 328,344, 345,212	C-BM103M2EN2	SBL, 0.01μF, ±20%, 25V	6
	C305,322, 323,201	C-BM223M2EN2	SBL, 0.022μF, ±20%, 25V	4
	C203,204, 205	C-BM223M2EN2	SBL, 0.022μF, ±20%, 25V	3
	C308,311, 312,314, 317,318	C-BM393M2EN2	SBL, 0.039μF, ±20%, 25V	6
	C309,330, 337~ 339,343	C-BM393M2EN2	SBL, 0.039μF, ±20%, 25V	6
	C315,320, 324,326	C-BM223M2EN2	SBL, 0.022μF, ±20%, 25V	4
	C202	C-BM102M2EN2	SBL, 0.001μF, ±20%, 25V	1
	C214	C-BM333M2EN2	SBL, 0.033μF, ±20%, 25V	1
	C346	C-BM682M2EN2	SBL, 0.0068μF, ±20%, 25V	1
	R204	T-D0123JBN2	Carbon, 12k, 5%, 1/4W	1
	R303,307, 308,310	T-D0104JBN2	Carbon, 100k, ±5%, 1/4W	4
	R304,312	T-D0680JBN2	Carbon, 68, ±5%, 1/4W	2
	R302,306, 311,319, 325	T-D0102JBN2	Carbon, 1k, ±5%, 1/4W	5
	R326	T-D0102JBN2	Carbon, 1k, ±5%, 1/4W	1
	R218,205, 220	T-D0222JBN2	Carbon, 2.2k, ±5%, 1/4W	3
	R316	T-D0221JBN2	Carbon, 220, ±5%, 1/4W	1
	R328	T-D0473JBN2	Carbon, 47k, ±5%, 1/4W	1
	R320,315	T-D0100JBN2	Carbon, 10, ±5%, 1/4W	2
	R305,321, 322,327, 309	T-D0103JBN2	Carbon, 10k, ±5%, 1/4W	5
	R213,216	T-D0103JBN2	Carbon, 10k, ±5%, 1/4W	2
	R323	T-D0224JBN2	Carbon, 220k, ±5%, 1/4W	1
	R324,212	T-D0104JBN1	Carbon, 100k, ±5%, 1/4W	2
	R318	T-D0150JBN2	Carbon, 15, ±5%, 1/4W	1
	R201,202	T-D0331JBN2	Carbon, 330, ±5%, 1/4W	2
	R215,217	T-D0182JBN2	Carbon, 1.8k, ±5%, 1/4W	2
	R207	T-D0562JBN2	Carbon, 5.6k, ±5%, 1/4W	1
	R208	T-D0153JBN2	Carbon, 15k, ±5%, 1/4W	1
	R203,209	T-D0273JBN2	Carbon, 27k, ±5%, 1/4W	2
	R210,317	T-D0682JBN2	Carbon, 6.8k, ±5%, 1/4W	2
	R211	T-D0102JBAN2	Carbon, 1k, ±5%, 1/6W	1
	R300	T-D0471JBN2	Carbon, 470, ±5%, 1/4W	1
SDK AMP P.C.B. ASSEMBLY				
46		R-A701886	PC board ass'y, SDK AMP	1
	R661	R-R110730	Preset resistor, 5k	1
	R651	R-R110729	Preset resistor, 5k	1
	IC651	LA2211	IC	1
	IC71	LA4440P	IC	1

Key No.	Ref. No.	Part No.	Description	Q'ty
	Q652	2SC1815GR	Transistor	1
	Q651	JA101Q	Transistor	1
	Q653~ 655	2SC2458GR	Transistor	3
	D651,652	DS442VG1	Diode	2
		IS2473VH	Diode	
	C654	C-EGM470M1IN2	Lytic, 47μF, ±20%, 6.3V	1
	C655	C-EGM221M2CN2	Lytic, 220μF, ±20%, 16V	1
	C656~ 659,653	C-EGM100M2CN2	Lytic, 10μF, ±20%, 16V	5
	C660	C-EGM101M1IN2	Lytic, 100μF, ±20%, 6.3V	1
	C82,182, 661,662	C-EGM100M2CF2	Lytic, 10μF, ±20%, 16V	4
	C71,171	C-EGW101M2AN2	Lytic, 100μF, ±20%, 10V	2
	C73,173	C-EGW102M2AN2	Lytic, 1000μF, ±20%, 10V	2
	C75,175	C-EGW470M2AN2	Lytic, 47μF, ±20%, 10V	2
	C76	C-EGW102M2CN2	Lytic, 1000μF, ±20%, 16V	1
	C77	C-EGW221M2CN2	Lytic, 220μF, ±20%, 16V	1
	C651	C-SMR22M6FN2	Tantal, 0.22μF, ±20%, 35V	1
	C652	C-SMR10M6FN2	Tantal, 1.0μF, ±20%, 35V	1
	C74,174	C-BM102M2EN2	SBL, 0.001μF, ±20%, 25V	2
	C72,172	C-FMZ154J2HN2	TF cap, 0.15μF, ±5%, 50V	2
	R658	T-D0470JBN1	Carbon, 47, ±5%, 1/4W	1
	R652	T-D0682JBN2	Carbon, 6.8k, ±5%, 1/4W	1
	R653	T-D0123JBN2	Carbon, 12k, ±5%, 1/4W	1
	R654	T-D0182JBN2	Carbon, 1.8k, ±5%, 1/4W	1
	R655	T-D0122JBN2	Carbon, 1.2k, ±5%, 1/4W	1
	R656	T-D0333JBN2	Carbon, 33k, ±5%, 1/4W	1
	R657	T-D0472JBN2	Carbon, 4.7k, ±5%, 1/4W	1
	R659	T-D0471JBN2	Carbon, 470, ±5%, 1/4W	1
	R660,664	T-D0102JBN2	Carbon, 1k, ±5%, 1/4W	2
	R662,665	T-D0562JBN2	Carbon, 5.6k, ±5%, 1/4W	2
	R663,666,667	T-D0103JBN2	Carbon, 10k, ±5%, 1/4W	3
	R71,171	T-D01R5JBN2	Carbon, 1.5, ±5%, 1/4W	2
	R72,172	T-D0330JBN2	Carbon, 33, ±5%, 1/4W	2
TUNER P.C.B. ASSEMBLY				2
47		R-A701887	PC board ass'y, Tuner	1
	L202,203	R-W17082-5	Choke coil, 0.27μH	2
	D71	ERZM10DK220	Variable resistor diode	1
	C79	C-EAS821M2CN2	Lytic, 820μF, ±20%, 16V	1
	C78	C-EAH101M2CN2	Lytic, 100μF, ±20%, 16V	1
	C80,81	C-KF103Z2HN2	Ceramic, 0.01μF, +80−20%, 50V	2
	C200	C-BM103M2EN2	SBL, 0.01μF, ±20%, 25V	1
	R200	T-D0152JBAN1	Carbon, 1.5k, ±5%, 1/6W	1
LOGIC P.C.B. ASSEMBLY				
48		R-A701888	PC board ass'y, LOGIC	1
	X901	R-S17353	Crystal oscillator	1
	CP6	R-S27321-5	Plug, 5P	1
	CP7	R-S27321-3	Plug, 3P	1
	CP284	R-S27321-7	Plug, 7P	1
	CP5	R-S27321-6	Plug, 6P	1
	CP4,3	R-S27207-9	Plug, 9P	2
	CP1	R-S27207-6	Plug, 6P	1
	CP2	R-S27207-10	Plug, 10P	1
	CR501	R-CXC719	Packed C&R	1
	T601	R-W5T795	IF transformer	1
	ANT	R-S27192-1A	Socket	1
	R505,603	R-R1107020	Preset resistor, 5k	2
	R250	R-R1107020-4	Preset resistor, 10k	1
	IC901	TC9146AP	LSI	1
	IC902	TD6104P	IC	1
	IC903	TA7324P	IC	1
	IC501	LA2113	IC	1
	IC251	LA3373	IC	1
	IC601	LA2205	IC	1
	Q901~908, 911~914, 920~924	2SC2021E	Transistor	18
	Q909,52, 152	2SA937MQ	Transistor	3
	Q910,916, 918,51, 151	2SC2458GR	Transistor	5

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PARTS LIST

Key No.	Ref. No.	Part No.	Description	Q'ty
	Q915	2SB698F	Transistor	1
	Q917,919	JA101Q	Transistor	2
	D921,922,923, 251,919	GMA01-FYI	Diode	5
	D902,903	GZA5R6Y	Zener diode	2
	D904~915	DS442-AT	Diode	12
	D917,918,920, 924,925	DS442-AT	Diode	5
	D931,257	DS442-AT	Diode	2
	D916	GZA10X	Zener diode	1
	D926,252~ 256,601,602, 956,957	DS442VG1 IS2473VH	Diode	10
	D927,929,930	GZA9R1Y-VG1	Zener diode	3
	D928	GZA7R5Y	Zener diode	1
	D900,901	SM-1A-02 ERB12-02	Diode	2
	C939	C-EMK330M2AN2	Lytic, 33μF, ±20%, 10V	1
	C54,154	C-EMKR10M2HN2	Lytic, 0.1μF, ±20%, 50V	2
	C901,903, 911,251	C-EMK100M2CN2	Lytic, 10μF, ±20%, 16V	4
	C264,265,935, 603,612,11	C-EMK100M2CN2	Lytic, 10μF, ±20%, 16V	6
	C56,111,504	C-EMK100M2CN2	Lytic, 10μF, ±20%, 16V	3
	C905,55	C-EGW10IM2AN2	Lytic, 100μF, ±20%, 10V	2
	C914	C-EGW10IM2CN2	Lytic, 100μF, ±20%, 16V	1
	C917	C-EGM470M2AN2	Lytic, 47μF, ±20%, 10V	1
	C920,257,902	C-EMK1R0M2HN2	Lytic, 1μF, ±20%, 50V	3
	C922	C-EMK4R7M2EN2	Lytic, 4.7μF, ±20%, 25V	1
	C923,604	C-EGM101M1IN2	Lytic, 100μF, ±20%, 6.3V	2
	C928,929, 931,932	C-EGM470M2AN2	Lytic, 47μF, ±20%, 10V	4
	C509	C-EGM220M2AN2	Lytic, 22μF, ±20%, 10V	1
	C252	C-EGM10M2HN2	Lytic, 0.1μF, ±20%, 50V	1
	C258	C-EMK2R2M2HN2	Lytic, 2.2μF, ±20%, 50V	1
	C259	C-EMK3R3M2HN2	Lytic, 3.3μF, ±20%, 50V	1
	C52,152,53, 153,924	C-EMK220M1IN2	Lytic, 22μF, ±20%, 6.3V	5
	C610	C-EGM4R7M2EN2	Lytic, 4.7μF, ±20%, 25V	1
	C611,912,913	C-EGM1R0M2HN2	Lytic, 1μF, ±20%, 50V	3
	C938	C-EGR220M1IN2	Lytic, 22μF, ±20%, 6.3V	1
	C266	C-BM333M2EN2	SBL, 0.033μF, ±20%, 25V	1
	C904,925,927, 930,256,933	C-BM393M2EN2	SBL, 0.039μF, ±20%, 25V	6
	C934,936,937	C-BM393M2EN2	SBL, 0.039μF, ±20%, 25V	3
	C908,909,910, 916,919,926	C-BM103M2EN2	SBL, 0.01μF, ±20%, 25V	6
	C507,508,253, 921,941	C-BM103M2EN2	SBL, 0.01μF, ±20%, 25V	5
	C915,510,609	C-BM222M2EN2	SBL, 0.0022μF, ±20%, 25V	3
	C918	C-BM223M2EN2	SBL, 0.022μF, ±20%, 25V	1
	C502	C-BM182M2EN2	SBL, 0.0018μF, ±20%, 25V	1
	C501	C-BM122M2EN2	SBL, 0.0012μF, ±20%, 25V	1
	C511	C-BM682M2EN2	SBL, 0.0068μF, ±20%, 25V	1
	C254,255	C-BM153M2EN2	SBL, 0.015μF, ±20%, 25V	2
	C512	C-BM332M2EN2	SBL, 0.0033μF, ±20%, 25V	1
	C607	C-BM102M2EN2	SBL, 0.001μF, ±20%, 25V	1
	C51,151	C-BM152M2EN2	SBL, 0.0015μF, ±20%, 25V	2
	C262,263	C-BM392M2EN2	SBL, 0.0039μF, ±20%, 25V	2
	C940	C-CJ150J2HN2	Ceramic, 15pF, ±5%, 50V	1
	C906	C-CJ330K2HN2	Ceramic, 33pF, ±10%, 50V	1
	C505	C-KB681K2HN2	Ceramic, 680pF, ±10%, 50V	1
	C503	C-CJ680K2HN2	Ceramic, 68pF, ±10%, 50V	1
	C506	C-KB331K2HN2	Ceramic, 330pF, ±10%, 50V	1
	C261	C-KS561J2HN2	Ceramic, 560pF, ±5%, 50V	1
	C602	C-CC151J2HN2	Ceramic, 150pF, ±5%, 50V	1
	C601	C-CC201J2HN2	Ceramic, 200pF, ±5%, 50V	1
	C606	C-KS102J2HN2	Ceramic, 0.001μF, ±5%, 50V	1
	C608	C-KB221K2HN2	Ceramic, 220pF, ±10%, 50V	1
	C907	C-CJ100D2HN2	Ceramic, 10pF, ±0.5pF, 50V	1
	C260	C-QMN471M2HN2	Mylar, 470pF, ±20%, 50V	1
	C605	C-QMX102M2HN2	Mylar, 0.001μF, ±20%, 50V	1
	R913	T-D0823JBN2	Carbon, 82k, 5%, 1/4 W	1
	R951	T-D0101JBAN2	Carbon, 100, ±5%, 1/6 W	1
	R905,906,251, 259,260,600	T-D0103JBAN2	Carbon, 10k, ±5%, 1/6 W	6
	R920,969	T-D0472JBN2	Carbon, 4.7k, ±5%, 1/4 W	2
	R929,954,956, 941,944,946	T-D0102JBN2	Carbon, 1k, ±5%, 1/4 W	6
	R948,506,601, 610	T-D0102JBN2	Carbon, 1k, ±5%, 1/4 W	4
	R932,930	T-D0473JBAN2	Carbon, 47k, ±5%, 1/6 W	2
	R942,945, 267,914	T-D0104JBN2	Carbon, 100k, ±5%, 1/4 W	4
	R926,602	T-D0561JBN2	Carbon, 560, ±5%, 1/4 W	2
	R936	T-D0103JBN2	Carbon, 10k, ±5%, 1/4 W	1
	R940,952	T-D0102JBAN2	Carbon, 1k, ±5%, 1/6 W	2
	R937,967,268, 52,968	T-D0104JBAN2	Carbon, 100k, ±5%, 1/6 W	5
	R953	T-D0100JBN2	Carbon, 10, ±5%, 1/4 W	1
	R943,947	T-D0222JBN2	Carbon, 2.2k, ±5%, 1/4 W	2
	R501	T-D0392JBAN2	Carbon, 3.9k, ±5%, 1/6 W	1
	R502,503,504, 931,933	T-D0472JBAN2	Carbon, 4.7k, ±5%, 1/6 W	5
	R507	T-D0333JBN2	Carbon, 33k, ±5%, 1/4 W	1
	R508	T-D0682JBN2	Carbon, 6.8k, ±5%, 1/4 W	1
	R254	T-D0682JBAN2	Carbon, 6.8k, ±5%, 1/6 W	1
	R255	T-D0273JBAN2	Carbon, 27k, ±5%, 1/6 W	1
	R256	T-D0122JBN2	Carbon, 1.2k, ±5%, 1/4 W	1
	R258	T-D0153JBN2	Carbon, 15k, ±5%, 1/4 W	1
	R261,262	T-D0223JBN2	Carbon, 22k, ±5%, 1/4 W	2
	R604	T-D0332JBN1	Carbon, 3.3k, ±5%, 1/4 W	1
	R606	T-D0562JBN2	Carbon, 5.6k, ±5%, 1/4 W	1
	R111	T-D0473JBN2	Carbon, 47k, ±5%, 1/4 W	1
	R55	T-D0683JBN2	Carbon, 68k, ±5%, 1/4 W	1
	R58	T-D0393JBN2	Carbon, 39k, ±5%, 1/4 W	1
	R605	T-D0272JBN2	Carbon, 2.7k, ±5%, 1/4 W	1
	R155	T-D0683JBAT1	Carbon, 68k, ±5%, 1/6 W	1
	R53,54,928, 901,908,966	T-D0104JBAT1	Carbon, 100k, ±5%, 1/6 W	6
	R152~154	T-D0104JBAT1	Carbon, 100k, ±5%, 1/6 W	3
	R907,917,934, 902,925,922	T-D0103JBAT1	Carbon, 10k, ±5%, 1/6 W	6
	R918,935,964,958	T-D0103JBAT1	Carbon, 10k, ±5%, 1/6 W	4
	R903	T-D0220JBAT1	Carbon, 22, ±5%, 1/6 W	1
	R904	T-D0223JBAT1	Carbon, 22k, ±5%, 1/6 W	1
	R923,252, 253,607	T-D0332JBAT1	Carbon, 3.3k, ±5%, 1/6 W	4
	R924	T-D0472JBAT1	Carbon, 4.7k, ±5%, 1/6 W	1
	R921,939,965	T-D0222JBAT1	Carbon, 2.2k, ±5%, 1/6 W	3
	R916	T-D0105JBAT1	Carbon, 1M, ±5%, 1/6 W	1
	R11	T-D0473JBAT1	Carbon, 47k, ±5%, 1/6 W	1
	R909,910, 911,912	T-D0221JBAT1	Carbon, 220, ±5%, 1/6 W	4
	R919	T-D0154JBAT1	Carbon, 150k, ±5%, 1/6 W	1
	R938,950,257, 609,56,57	T-D0102JBAT1	Carbon, 1k, ±5%, 1/6 W	6
	R927	T-D0102JBAT1	Carbon, 1k, ±5%, 1/6 W	1
	R949,955	T-D0100JBAT1	Carbon, 10, ±5%, 1/6 W	2
	R509	T-D0333JBAT1	Carbon, 33k, ±5%, 1/6 W	1
	R957	T-D0563JBAT1	Carbon, 56k, ±5%, 1/6 W	1
	R608	T-D0394JBAT1	Carbon, 390k, ±5%, 1/6 W	1
	R51,151	T-D0272JBAT1	Carbon, 2.7k, ±5%, 1/6 W	2

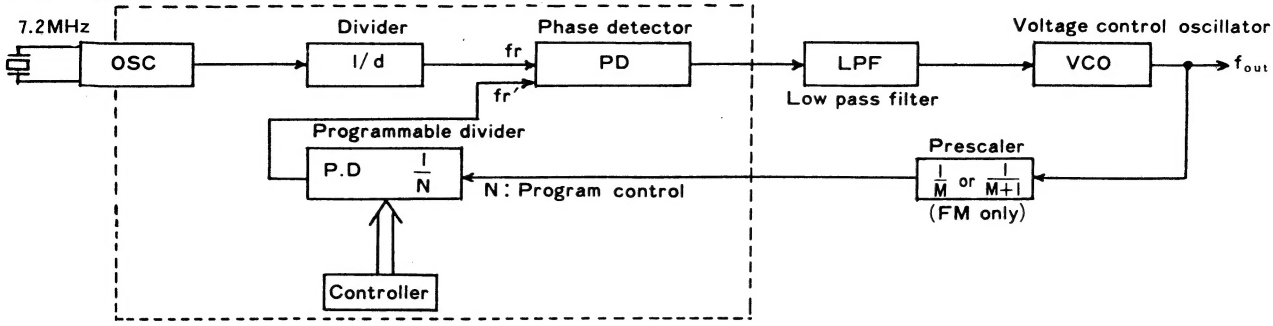
LED P. C. B. ASSEMBLY

49		R-A701889	PC board ass'y, LED	1
51	S901~903, 908~914	R-S47970	Key switch	10
52	S917-AB S916-AB S915-AB	R-S47989	Push switch	3
	CP901,902	R-S27649-12	Plug,-12P	2
	R959	T-D0561JBAN1	Carbon, 560, ±5%, 1/6 W	1
	R960~962	T-D0390JBN1	Carbon, 39, ±5%, 1/4 W	3
	R963	T-D0221JBAN1	Carbon, 220, ±5%, 1/6 W	1

NOTES: 1. Part orders must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and/or resistors must be multiple of 10 pcs.

DESCRIPTIONS

1. BASIC OPERATION OF PLL FREQUENCY SYNTHESIZER



The illustration above is a block diagram which is a fundamental PLL frequency synthesizer.

In order to obtain reference frequency fr, the frequency of 7.2 MHz generated from a crystal oscillator (OSC) is passed into a divider circuit of 1/d.

This fr is compared with fr', and runs through phase detector (PD) and low pass filter (LPF) to be inverted to direct-current signal, which is then applied as varicap voltage of voltage control oscillator (VCO), thereby controlling the oscillation frequency.

This oscillation frequency f_{out} is divided down to 1/N by programmable divider (PD), so that one closed loop is fixed in the relation of

$$f_{out} = fr \times N$$

therefore, the operation of PLL is stabilized.

In the case of automatic channel selection, the dividing ratio N is altered by the PD by a command from controller, and f_{out} is changed accordingly.

Programmable divider

Since the oscillation frequency of VCO is very high as compared with fr, it is divided down to 1/N (in the case of AM) to decrease the difference from fr in this circuit.

Phase detector

This is a circuit to detect the difference in frequency and phase between reference frequency fr and comparison frequency fr' in terms of pulses.

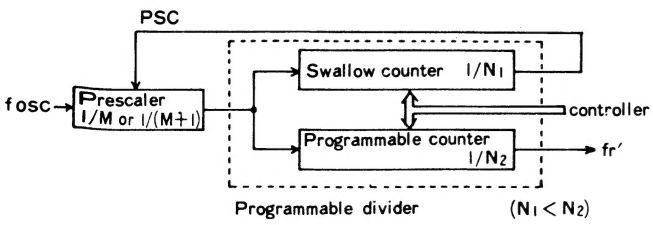
Low pass filter

This circuit is intended to vary and fix the output voltage in order to deliver a varicap voltage necessary for desired VCO frequency, on the basis of the output of the phase detector.

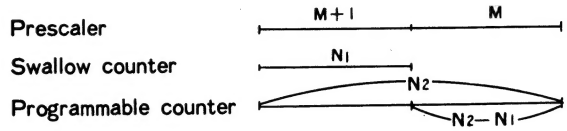
Prescaler

The local oscillation frequency in FM is higher than the operating speed of the programmable divider of PLL, thereby opposing to accurate operation. To avoid this, the local oscillation frequency is preliminarily divided down in this circuit to a proper frequency permitting reliable operation of the programmable divider.

Pulse swallow count system is employed. A couple of programable divider (swallow counter and programable counter) can be selected.



$$f_{OSC} = \{ (M+1)N_1 + M(N_2 - N_1) \} fr'$$
$$= (MN_2 + N_1) fr'$$



The prescaler at first starts the frequency division with the ratio M+1. Then swallow counter and programmable counter start counting simultaneously. When N_1 inputs are applied, swallow counter stops counting. Then the frequency division ratio of the prescaller is switched to M. Programmable counter continues to count however and stops when the input reaches N_2. The frequency division ratio of the prescaller switches back to M+1 and swallow counter and programmable counter start to count again.

FM reception employs the pulse swallow count system. AM reception does not employ the pulse swallow count system but employs the direct frequency division system and so only programmable counter is operated.

2. GENERAL DESCRIPTION OF LOGIC IC (IC901)

This IC includes PLL and controller is a C-MOS LSI for digital tuning of FM/MW/LW PLL frequency synthesizer system and controls such functions as FM/MW/LW automatic channel selection, preset memory and frequency digital display.

Pins in IC901

PIN No.	SYMBOL IN	SYMBOL OUT	FUNCTIONAL EXPLANATION
1	GND		Ground (0V)
2	$\overline{XT}$		Crystal OSC terminal (7.2 MHz)
3	XT		〃
4	FM		FM band determination
5	MW		MW 〃
6	LW		LW 〃
7	MANUAL		Manual tuning mode
8	AUTO		Auto search tuning mode
9	UP		Up operation key signal
10	DOWN		Down operation key signal
11	STO		Memory store command

DESCRIPTIONS

	SYMBOL		FUNCTIONAL EXPLANATION
	IN	OUT	
12 ~ 17	M1–M6		Preset memory channel determination
18 ~ 21		L1–L4	Dot display output
22	OSC2		AM OSC terminal
23	OSC1		FM 〃
24 ~ 27		H4–H1	Dot display output
28		MUTE	Muting output signal ("H")
29	E2		Area determination
30	E1		
31		Pee	"Pee" sound output
32	IF in		AM-IF signal, Auto search stops.
33	STOP		Auto search stop signal ("H")
34	D0–2		Phase comparator output
35	D0–1		
36	TEST		Test terminal
37	FM in		FM programmable counter input
38		PSC	Prescaler 1/ 30 or 1/32 divider select
39	AM in		AM programmable counter input
40	$\overline{INH}$		Inhibition input ("L")
41	$\overline{INT}$		Initialize input ("L")
42	V_{DD}		(5 ± 0.5 V)

3. AUTO TUNING AND AUTO STOP

a) FM band

When High level signal is applied to STOP terminal (33pin), FM auto search tuning stops.

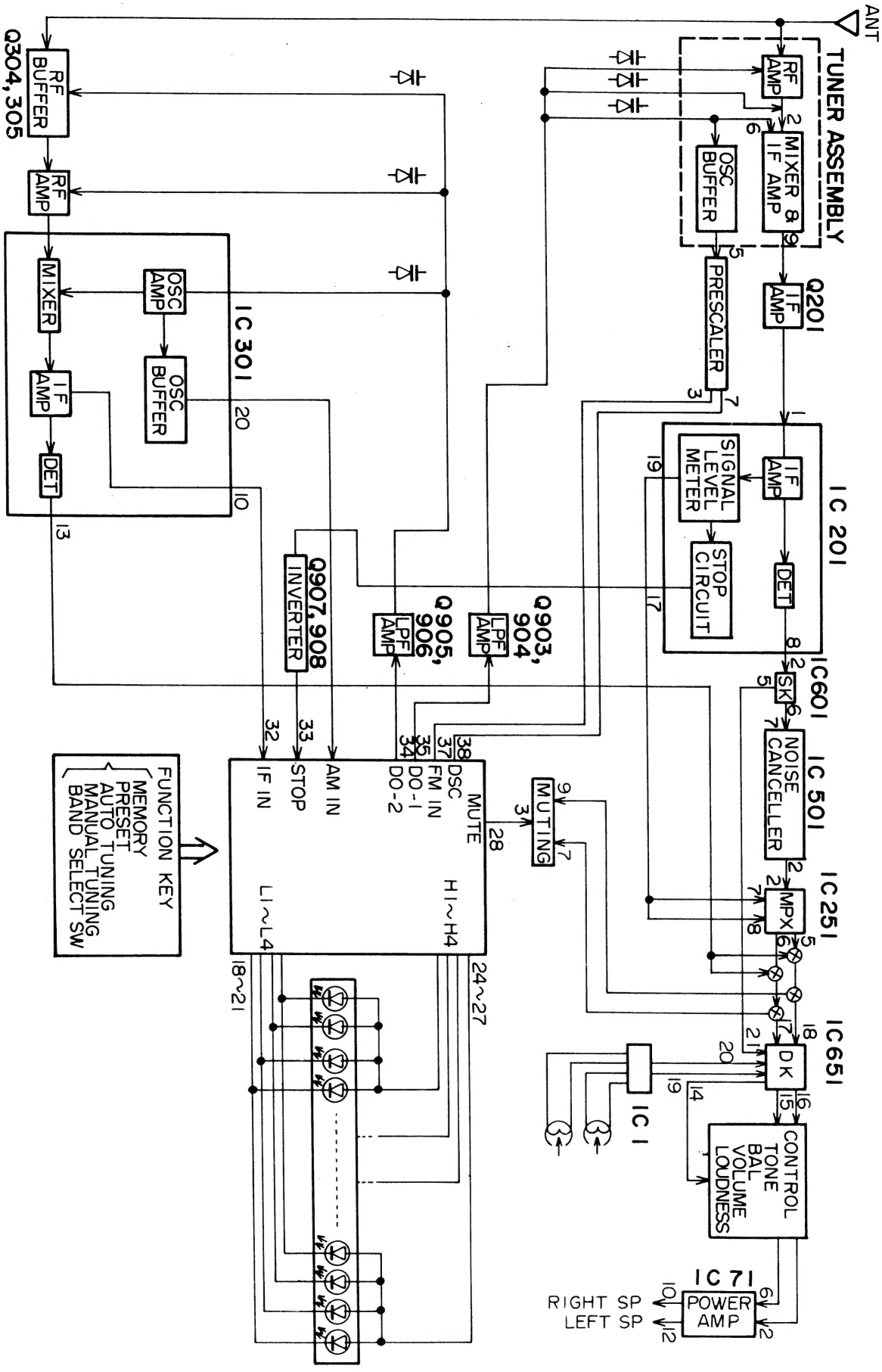
b) MW/LW band

When the regulated frequency is supplied to IF in terminal (32 pin), AM auto search tuning stops.

Regulated frequency

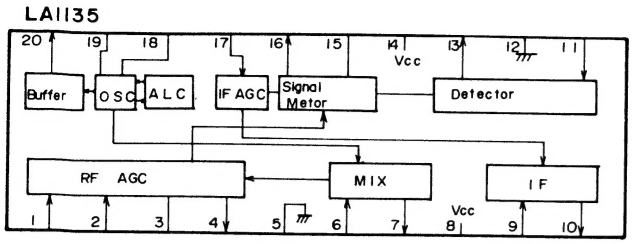
MW	450kHz ± 3kHz
LW	450kHz ± 600Hz

V_{IN} (IF) $\geqq 0.5 V_{P-P}$

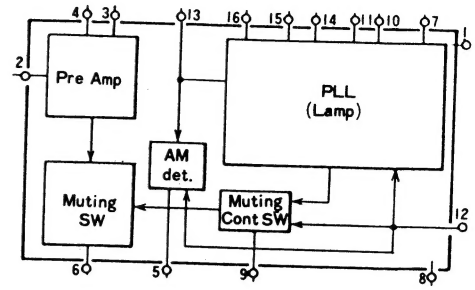

ANT
TUNER ASSEMBLY
RF AMP
MIXER & IF AMP
OSC BUFFER
PRESCALER
Q201
IF AMP
IC 201
SIGNAL LEVEL METER
STOP CIRCUIT
DET
IC601
SK
IC 501
NOISE CANCELLER
IC 251
MPX
IC651
DK
IC 1
CONTROL
TONE
BAL
VOLUME
LOUDNESS
IC 71
POWER AMP
RIGHT SP
LEFT SP
Q304, 305
RF BUFFER
RF AMP
IC 301
MIXER
OSC AMP
OSC BUFFER
IF AMP
DET
Q907, 908
INVERTER
Q905, 906
LPF AMP
Q903, 904
LPF AMP
MUTING
MUTE
DSC
FM IN
DO-1
DO-2
IF IN
STOP
AM IN
L1~L4
H1~H4
FUNCTION KEY
MEMORY
PRESET
AUTO TUNING
MANUAL TUNING
BAND SELECT SW

IC FUNCTIONS (2)

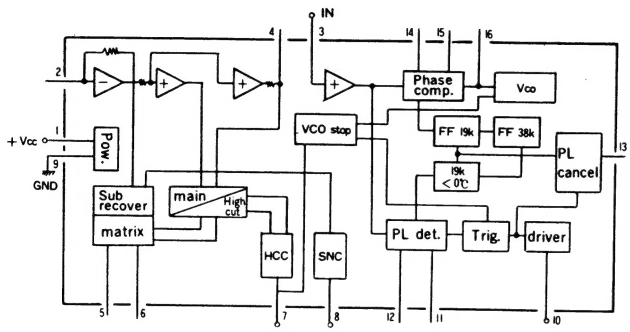
IC301, LA1135



IC251, LA3373



IC601, LA2205



IC901, TC9146AP